

EEL6562: Assignment #2 (Spring 2004)

(distributed 03/23/2004)

Note: This is an *individual* assignment, so please do your own work.

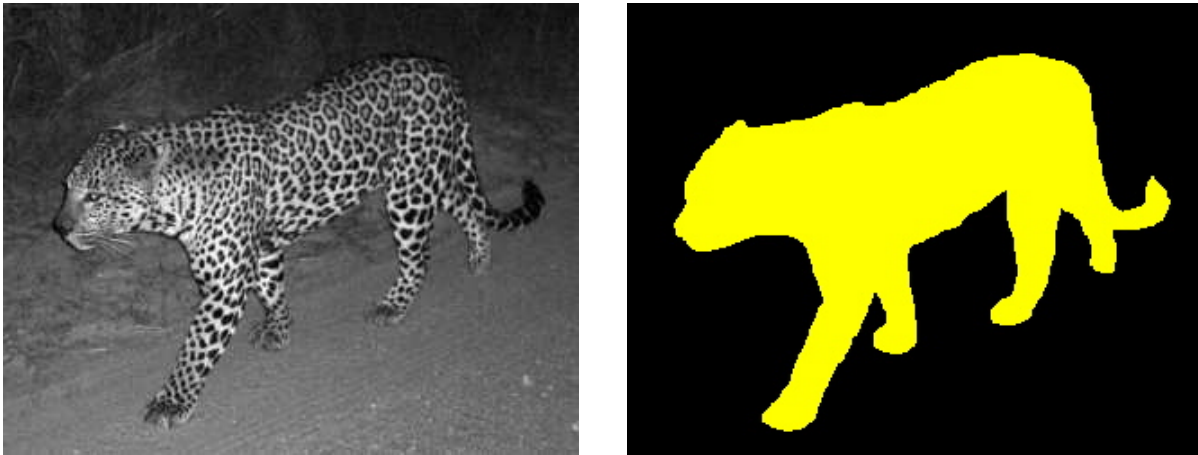
1 Overview

Goal: To segment *leopards* in natural-scene images.

For this assignment, you are given gray-scale images containing *leopards* in natural-scene images. Figure 1(a) shows one example, while the course web site at:

<http://mil.ufl.edu/~nechyba/ee16562/assignments.html>

contains several other sample images. The program you develop should segment input images of this type, generating an output image that assigns the color *black* to background (non-leopard) pixels, and a unique color (not equal to *black*) to pixels corresponding to the leopard, as is illustrated in Figure 1(b).



(a)

(b)

Figure 1: (a) Sample input image; (b) sample desired output image.

Note: It is not expected that your program will produce a perfect output like the one shown in Figure 1(b), and the grading (discussed further below) allows for substantial error in your segmentation while still receiving full credit.

2 Grading

This assignment is worth **100 points**.

2.1 Report (25 points)

Turn in a short report (no more than 5 pages) describing your algorithm.

2.2 Demonstration (75 points)

Your work will be graded on a live demonstration of your program¹ where you will demonstrate your program on a test image, similar to those provided as part of this assignment. Demonstrations will take place either in the NEB computer lab during dates to be announced, but no earlier than the week of **03/12 - 03/16**. After times and procedures for those dates are finalized (via e-mail), you will be able to sign up for a specific date/time.

For those who cannot bring a laptop or demo on one of the NEB lab computers, the TA will have a computer (*PIII 846 MHz with 512 MB RAM running Windows XP Pro*) available with *Mathematica 4.2 for Students*. Computers in the NEB lab have *Matlab* and *Visual C++*, as well as Unix environments. If your program will not work on any of these and you cannot bring a laptop of your own, email the TA (mcnese@ufl.edu) as soon as possible, but at least 3 days prior to your demonstration. **Note:** *It is important that you test your program on the computer you will use for the demo prior to your demo.*

For the demonstration, you will be given one test image to segment, similar to the images available on the class web site. Specifically, the test image will be approximately the same size as the provided sample images. Your program must output a segmented image in an uncompressed image format (e.g. BMP, PPM) named `yourname.ext` (e.g. `michaelnechyba.ppm`). This image must be made available to the TA through e-mail, floppy, CD, flashdisk, etc., at the time of the demo.

Your grade will be computed as follows. Let N_B denote the number of background pixels in the test image, let N_F denote the number of foreground (jaguar) pixels in the test image, let N_{Bc} denote the number of correctly labeled background pixels in your segmented image, and let N_{Fc} denote the number of correctly labeled foreground pixels in your segmented image. Then the points p for your demo will be computed as:

$$p = \min[75, 100 \times (\frac{N_{Bc}}{N_B} + \frac{N_{Fc}}{N_F} - 1)] \quad (1)$$

Note: 75% correctly classified pixels yields the maximum number of points possible.

Please make sure that your program segments an image reasonably fast on the demonstration computer. *If your program takes longer than 10 minutes you will receive no credit for the demonstration part of the assignment.* If your algorithm is only partially complete (i.e. still requires manual input), partial credit may be awarded.

Due to the large class size, there will be no makeup demonstration times. If you miss your allotted time, you will be given zero points for the demonstration. If for some reason your program does not run during that allotted time, you will also receive a zero for the demonstration.

Additional notes:

1. If you decide to find other images of jaguars on the web or elsewhere to test your algorithm, you should make sure that such images are gray-scale and roughly the same size as the ones provided on the class web site.
2. You may assume that in the test image, no jaguar pixels will appear near the border of the image.

¹Students on FEEDS will be notified about the procedure for evaluating their assignment separately via e-mail.